In the fourth part of the paper the author relates a great number of experiments, which concur in proving that when a piece of metal is moved in any particular direction, either in front of a single magnetic pole, or between the opposite poles of a horse-shoe magnet, electrical currents are developed which pass along the substance of the metal in a direction transverse to that of its own motion. By the application of this principle, the author is enabled to explain the various phænomena which take place in the experiments of Arago and others, where magnetic action appears to be developed by rotation; and which have been erroneously attributed to simple magnetic induction, and to the time supposed to be required for the progress of that induction. The electro-magnetic effect of the electric current induced in a conductor by a magnetic pole, in consequence of their relative motion, is such as tends continually to diminish that relative motion; that is, to bring the moving bodies into the state of relative rest; so that if the one be made to revolve by an extraneous force, the other will tend to revolve with it in the same direction, and with the same velocity.

A paper was read, entitled "Some Remarks on the internal Structure of the Platypus Anatinus (*Ornithorhyncus paradoxus*, Blum.)." By Richard Griffin, Esq. Communicated by Dawson Turner, Esq. F.R.S.

Having an opportunity of examining two specimens of the Ornithorhyncus, the one male, the other female, belonging to the Norfolk and Norwich Museum, the author found in the latter two large mammary glands, one on each side of the chest, and covering nearly the whole under surface of the animal; numerous ducts proceeded from them, perforating the skin, at two circular portions, which presented no elevation corresponding to nipples. The Fallopian tubes terminate by very small orifices in the cloaca: posterior to their terminations the author observed two slightly projecting processes, containing each the orifice of a duct which proceeds to a length of at least two inches, but the continuation of which could not be traced in the specimen examined in consequence of the injuries it had received. In the male, three pointed processes were noticed at each extremity of the corpora cavernosa of the penis, the cavities of which do not communicate with one another, and are separated before their termination. The spur of the male is furnished with a sac, of the size of a pea, containing a poisonous fluid, which by means of a canal is conducted into a wound inflicted by the spur.

December 22, 1831.

HIS ROYAL HIGHNESS THE DUKE OF SUSSEX, K.G., President, in the Chair.

The Right Hon. Sir James Graham, Bart. was elected a Fellow of the Society.

A paper was read, entitled "Some Account of a New Volcano in

the Mediterranean." By John Davy, M.D. F.R.S., Assistant Inspector of Army Hospitals.

The first intelligence of the breaking out of the volcano, which is the subject of the present paper, was brought to Malta, on the 16th of July last, by a merchant vessel. It was confirmed soon after by Captain Swinburne, of H.M.S. Rapid, who had succeeded in approaching very near the island. The crater of the volcano, which was in great activity, was then only a few feet above the level of the sea. Several shocks of an earthquake had been felt near the same spot about a month before the eruption. The volcano continued active till the 16th of August, and the island it was forming gradually enlarged in all its dimensions; but since that period there has been no fresh eruption. In the end of August, a survey of the island was carefully made by Captain Wodehouse, R.N. of H.M. brig *Ferret*; and a plan drawn by him is annexed to the present paper. The circumference of the island is about 3240 feet, and its greatest height 107 feet; the circumference of its crater is about 780 feet. The surface of the island is composed entirely of ashes and cinders, without any lava. The crater contained turbid salt water, having a temperature of 200° Fahr. and emitting a constant supply of gas. The water in the immediate neighbourhood of the island was very shallow, not exceeding three or four feet, and the crater was rapidly filling up by the falling in of its margin.

The author could not learn that anything unusual had been noticed as having occurred in any of the neighbouring volcanic regions, either at the time of the eruption or immediately antecedent to it. He describes the phænomena, which fell under his own observation, on a visit which he made to the island on the 5th of August. During the most violent eruptions, a large quantity of dense white vapour, resembling snow or bleached wool, rose to a great height in the atmosphere, and assumed various extraordinary forms; this was followed by columns of perfectly black matter, rising to the height of three or four thousand feet, and spreading out very widely, even to windward. The subterranean sounds attending the eruptions were not very loud, and were much exceeded by that of the electrical explosions accompanying the lightning, which was seen to dart in various directions in the atmosphere of the eruption. To leeward of the volcano, the sea was much discoloured by the admixture of ashes and fine dust, and an abundance of light cinders were floating on its surface. Even when the author was enveloped in the dark cloud of ashes falling from the volcano, not the smallest odour of bitumen, of sulphuretted hydrogen, or of sulphureous or any other acid, was perceptible; nor was any inconvenience felt in respiration. No appearance of flame, and but little light, was exhibited during these eruptions.

The solid products ejected from the volcano appeared, on examination, to differ more in form than in chemical composition; and were found to consist of alumina, lime, magnesia, and silex, coloured by protoxide of iron, and without any potash. With the exception of small masses of vesicular basalt, similar to the common lava of Etna and Vesuvius, these meterials exhibited no crystalline structure. The

water taken from the crater appeared to consist of sea-water holding in suspension a fine dust, together with filaments resembling vegetable fibres, which the author supposes to have been derived from sea-weed drawn into the water. The saline ingredients of this water differed from that of the Mediterranean, chiefly in containing more sulphate of lime, and a little alumina, oxide of iron, and a trace of oxide of manganese; all these in combination with an acid, probably the sulphuric or muriatic, and a notable portion of hypersulphite of lime and magnesia. He could not detect in it any free acid or alkali, or the presence, even in combination, of any potash or ammonia, or nitric acid, nor the slightest trace of bromine or iodine. The gas emitted by the volcano appeared, as far as could be determined from an examination of two specimens, to consist chiefly of carbonic acid, with a trace of sulphuretted hydrogen.

The author observes in conclusion, that the results of his inquiry are almost entirely of a negative kind; and in this respect correspond with those obtained by Sir Humphry Davy, with respect to Vesuvius, and which are described in his paper "On the Phænomena of Volcanos, published in the Philosophical Transactions for 1828. They accordingly tend to corroborate the simple hypothesis there adopted in explanation of the phænomena of volcanic action; namely, that of the existence of an ignited nucleus of fluid matter, occasionally forced through the cooled crust of the earth by the expansive power of steam and gas: and they militate strongly against the hypothesis of the chemical origin of volcanos, and of their being attended by a decomposition of water by the metallic bases of the earths and alkalies.

A drawing of the volcano in its active state of eruption accompanied the paper, together with a plan, and views of the island.

January 12, 1832.

JOHN BOSTOCK, M.D. Vice-President, in the Chair.

The Bakerian Lecture for 1832, entitled "Experimental Researches in Electricity—Second Series," by Michael Faraday, Esq. F.R.S. was read.

The success of the author in exhibiting the evolution of electricity by induction from ordinary magnets, led him to conclude that similar effects might be obtained from the magnetism of the earth, and even to an extent that might render it available in the construction of new electrical machines. These expectations have been fully realized; and the researches which establish the influence of terrestrial induction in giving rise to electrical currents, form the subject of this second paper.

Whenever a hollow helix, the terminal wires of which were connected with those of a galvanometer, and which inclosed a cylinder of soft iron, was held with its axis in the line of the magnetic dip, and suddenly inverted, the evolution of electric currents was immediately rendered sensible by the deflection of the needle of the galvanometer; a deflection in the contrary direction being produced the moment the helix was again inverted, so as to recover its first